

position, &c. But the details of the scientific process, and consequently its results, are a function of the mind of the investigator, as well as of the "facts" investigated. Thus there are well-defined types—especially national types—of scientific interpretation, corresponding to typical differences upon the subjective side of the epistemological relation. It follows that an inquiry into the scientific process, to be fruitful, must be based upon a study of its concrete manifestations in history.

This principle is applied in the chapters that make up the greater part of Herr Volkmann's book. The last third is devoted to an analysis of the influence of scientific thought and discovery upon the general intellectual life of our time, as represented in its philosophy, its views on education, &c. A lengthy appendix consists of a reprint of two papers, one a criticism of Newton's methods in the "Principia," the other a critical comparison between the fundamental ideas of Newton's mechanics and the alternative concepts proposed by Hertz.

OUR BOOK SHELF.

Photograms of the Year 1910. Typical Photographic Pictures Reproduced and Criticised. Edited by H. S. Ward. Pp. 160. (London: G. Routledge and Sons, Ltd., Dawbarn and Ward, Ltd.; New York: Tennant and Ward, 1910.) Price, paper cover, 2s. 6d. net.; cloth cover, 3s. 6d. net.

It is very useful and helpful to the photographer to have under one cover a typical set of the photographs of the year with attendant criticisms of each. It is especially valuable to those who have not had the opportunity of studying the originals for themselves. This annual should therefore be appreciated by a great number of workers, and the one now issued is a worthy follower of the former publications. In the collection here submitted the photographs have been chosen from an enormous number, and the selection, as we are told, has been made by one "who has had exceptional opportunity of considering the world's output for a quarter of a century."

This year the book has been increased by the addition of eight pages of plates, reproduced by the three-colour process from originals by the three-colour carbon method, as well as by the newer single exposure processes on autochrome, Thames, and dioptichrome plates. While the editor points out that these processes and their reproductions are not yet at the "ideal" stage of natural colour photography, they yet afford examples of the expression of artistic individuality. The book, as usual, is of an international character exhibiting photographs by Continental, Colonial, and American workers. It contains forty-eight pages of letterpress and 161 reproductions in monochrome and eleven in colours.

The "Code" School Garden and Nature Note-Book.

Edited by G. Lewis. Pp. 96. (London: H. Marshall and Son, n.d.) Price 9d.

This little note-book is intended to help the scholar and the teacher in systematising the work and the observations in the school garden. Unless a careful record is kept, the full educational value of many of the observations cannot be obtained, but there may be some difficulty in keeping the records in such a way that they shall be readily accessible. This difficulty is obviated in the present book. The main part of it is divided into twelve parts, one for each month, each consisting of five pages. On the first are a few

reminders for the month, showing what should be done in the fruit, flower, and vegetable gardens, what the animals and birds are doing, and what to look for in wild plant-life. The next two pages are for a record of work done in the garden; the fourth is ruled up for meteorological observations, but as only fourteen entries can be made it is clear that daily readings are not contemplated. The last page is for nature observations. At the end of the book are pages for crop records, for temperature and rainfall charts—one for atmospheric pressure might usefully have been added—and for profit and loss account.

The mechanical labour of keeping observations is thus reduced to a minimum, and at the same time the record can always be traced back if necessary. Only those who have attempted to get together class records can realise entirely what a saving of time and trouble this means.

One or two points in the introductory pages want alteration. A loam is not "a soil composed of equal parts of clay and sand." It is not only unnecessary, but undesirable, to give the name "sulpotide" to the definite and well-known sulphide of potassium wash; if the scholar or teacher looked in the index of a standard gardening book he would hardly be likely to see the word mentioned. The author recommends the injection of carbon bisulphide into the soil to kill the larvæ of the click beetle (wireworms); this is hardly a school operation, even if it were effective, and the evidence on this point is by no means clear. But apart from these little points the book is very useful, and can be commended for class purposes.

Handbuch der vergleichenden Physiologie. Edited by Hans Winterstein. Band ii., Erste Hälfte. Neunte Lieferung. Physiologie des Stoffwechsels, Physiologie des Zeugung. Pp. 819-980. Band iii. Zweite Hälfte. Zehnte Lieferung. Physiologie der Energieproduktion. Physiologie der Form. Pp. 161-320. (Jena: Gustav Fischer, 1910.) Price per fasciculus 5 marks.

WHEN the earlier fasciculi of this ambitious work appeared, we noted the general characters and aims of the undertaking. The ninth fasciculus contains a continuation of Prof. W. Biedermann's article on nutrition in the different classes of the world of life; but the article in question is not yet concluded. Each group is considered in detail, and the outcome will be a most valuable work of reference, and contains a mine, not only of information, but of references to original researches. The bibliographical notices relating to digestion and nutrition in the insects and myriapods alone number 247.

The tenth fasciculus is a portion of the third volume, which deals with quite different subjects. No doubt it is a convenience to the editor to print the bits as they are ready, though it is a little confusing to the reader. It contains portions of two articles; the first is the conclusion of an article on the production of electricity in animals and plants, by Prof. S. Garten, and the second the commencement of an article by Prof. Ernst Mangold, on the production of light in living things, especially in animals. The two articles manifest the same thoroughness of treatment noticeable in the previous fasciculi, and we congratulate the editor on having secured the service of collaborators who are all actuated by the same high ideals.

Guide to the British Vertebrates Exhibited in the Department of Zoology, British Museum (Natural History). Pp. vii+122, with a plan and 26 illustrations. (London: Printed by order of the Trustees of the British Museum, 1910.) Price 1s.

THIS guide contains a concise account of the British vertebrates other than the turtles and marine fishes,

which are altogether omitted, and the Cetacea, of which only a list is given. The seventy-five species of mammals are dealt with in an interesting manner, references being made to their habitat, food, care of young, change of coat, hibernation, &c. The common and Latin name of each species is given, and we are glad to note that where the Latin name has recently been changed the older and more familiar designation has also been added. The large number (442) of birds in the British list necessarily means that each can receive only comparatively short notice in the space available; nevertheless, a large amount of interesting information is packed into the twenty pages devoted to this part of the subject. The reptiles—three snakes, the blind-worm, and two lizards—and the Amphibia, seven in number, are described, with notes on their distribution and habits. The account of the fishes, which is restricted to those occurring in fresh water, also contains many interesting observations on their distribution, the distinctions between allied species, spawning, &c.

An appendix contains a full list of the species of vertebrates, other than turtles and marine fishes, which have been recorded from the British area. In the case of those birds which have occurred not more than six times notes are added or references given to the records of capture. The illustrations, about half of which are reproduced from photographs, are good, and several are of special excellence. The volume forms a thoroughly serviceable guide to the collection.

The Sea-Kings of Crete. By the Rev. James Baikie. Pp. xiv+274. (London: A. and C. Black, 1910.) Price 7s. 6d. net.

As a compilation this work shows great diligence; it has evidently been written *con amore*, and its aim is most praiseworthy; but it has no scientific value. We prefer to see *œuvres de vulgarisation* of this kind written, when possible, by the excavators themselves. This is no doubt a counsel of perfection; they have usually too much to do to write popular books. But in any case, such books should only be written by trained archaeologists with a first-hand knowledge of the subject and a personal acquaintance with Crete itself. Of these qualifications we do not see much evidence in Mr. Baikie's work, which, after the publication of the books of Mrs. Hawes (a Cretan excavator) and Prof. Burrows, seems scarcely needed.

Pinro. (Brook's patent.) (W. J. Brooks and Co., Letchworth, Herts.) Price 1s. per twelve yards.

This device consists of a thin metal tape, from which fine steel points project at intervals of about four inches. It is intended to be used by draughtsmen as a substitute for drawing-pins, and also for attaching canvas, posters, fabrics, &c., continuously along the edges. The contrivance does not seem to us likely to be generally adopted, but there are special circumstances under which it might be found very serviceable.

Teachers' Notes on Nature-Study: Plants and Animals. Pp. viii+232. (London: Blackie and Son, Ltd., n.d.) Price 1s. 6d. net.

This re-issue of an old work will not commend itself to teachers who desire to make the school study of science a training in accurate observation, simple reasoning, and precise expression. The method of teaching, the haphazard arrangement of subjects, and the general absence of scientific treatment, all remind the reader of the discredited style of "object-lesson" common ten or fifteen years ago. The compiler, whose name is withheld, does not appear to realise the necessity in the case of young pupils for basing every lesson on plants upon specimens in the hands of

each child, and encouraging the children to draw from the specimen rather than from the teacher's black-board sketches.

The Scientists' Reference Book and Pocket Diary for 1911. (Manchester: J. Woolley, Sons and Co., Ltd.) Price 1s. 6d.; bound in Morocco, 2s. 6d.

In addition to a handy diary in which provision is made also for memoranda and addresses, this publication provides a very useful book of tables and facts likely to be of use to workers in science, as well as to students. In view of its small price the combination is likely to secure a wide popularity.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Historical Note on Recalescence.

THE interesting *résumé* of Prof. Arnold's British Association paper on recalescence, which appeared in NATURE for December 1, contains the following statement in the opening paragraph:—

"In 1868 the late Dr. Geo. Gore, F.R.S., discovered the recalescent points now known as Ar₁ and Ar₂, and in 1872 Prof. W. F. Barrett, F.R.S., discovered the recalescent point Ar₁, which is now known as the carbon change point. Prof. Barrett gave the phenomena the generic title of 'recalescence,' by which they have been known ever since."

As no little misapprehension exists on this subject, it is desirable, as a matter of historical accuracy, to state that Dr. Gore did not discover the phenomenon of *recalescence*, but he was the first to observe the remarkable momentary elongation of an iron wire during cooling from bright incandescence, which important observation subsequently led to the discovery of recalescence.

Owing to the great practical importance which recalescence has assumed in the hardening and heat treatment of steel, it may perhaps be of interest if I briefly state the early history of this discovery.

The Proceedings of the Royal Society for January 28, 1869, contains a paper by Dr. Gore which records the anomalous behaviour of cooling iron above referred to—its sudden transient expansion at a dull red heat. This anomalous behaviour Dr. Gore found was not shared by other metals, and he states that no reverse effect was noticed upon heating iron wire to incandescence.¹

Some two years later, having to deliver a lecture before the Royal Dublin Society on the "Molecular Changes that accompany the Act of Magnetisation," I was anxious to show Mr. Gore's interesting discovery, as it appeared likely to be connected with the resumption of the magnetic state in iron when cooling from a white heat. In answer to my inquiry Mr. Gore kindly furnished me with his apparatus, and as he said he had no further use for it I purchased it from him, and it is still in my possession. To make the effect visible to a large audience a mirror was attached to the spindle which moved the index, and from it a ray of light was reflected to a distant scale. This device revealed the fact, overlooked by Dr. Gore, that a small momentary *contraction* of the iron wire took place during its heating to incandescence, approximately at the same temperature at which the momentary elongation occurred in cooling.²

Dr. Gore having informed me, in a letter dated May, 1872, that he was not pursuing his original observation and that the subject was quite open to anyone, I felt at liberty to continue the inquiry. Accordingly, the following year, Dr. Guthrie having kindly placed his laboratory

¹ In fact some eighteen months after his original observation Dr. Gore states in a paper published in the *Phil. Mag.* for September, 1870 (the italics are his):—"The iron during cooling . . . suddenly elongated by diminution of cohesion . . . a corresponding but reverse phenomenon did *not* occur during the process of *heating* the wire."

² This lecture was repeated at the London Institution a year later, and a full report of it is published in the Journal of that Institution.